C·R·E·S®
CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

REPORT
SPRING 1994

A New CRES Endowment from an Old Friend

One of the happiest events in a zoo or wildlife park is the arrival of a newborn. Yet, one of the most difficult predictions for staff to make is whether a species will reproduce in captivity.

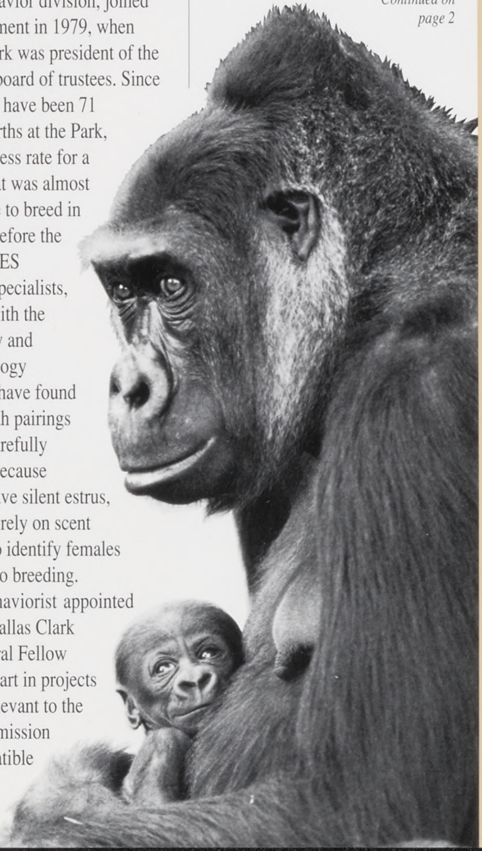
The success or failure of a breeding program for a species is as good as the behaviorists who observe and modify the management of zoo animals. This is a little-known fact recognized by J. Dallas Clark, trustee emeritus and past board president of the Zoological Society of San Diego, who recently endowed the J. Dallas Clark Postdoctoral Fellowship in Behavior at CRES. Since his first appointment to the buildings and grounds committee at the Zoo in 1958, Dallas Clark has been thinking about the Zoo and its animals' welfare for 35 years. "Enhancing the animals' environment is a priority at the Zoo and Park, where we develop naturalistic habitats for animals that lead to their overall enrichment and result in better breeding and reproduction."

Some of the most significant work done at the San Diego Zoo and the San Diego Wild Animal Park is done behind the scenes and off exhibit: the Primate Pad at the Zoo and the Cheetah and Primate Breeding Facility at the Park are operated by the behavior division of CRES. With the help of curatorial and keeper staffs, notable reproductive successes with lion-tailed macaques and cheetahs have been achieved at these off-exhibit breeding facilities.

As Dallas Clark observes, "We wouldn't have the success with our cheetah population at the Park if Don Lindburg hadn't been such a student of animal behavior." Dr. Donald Lindburg, who heads the CRES behavior division, joined the department in 1979, when Dallas Clark was president of the Society's board of trustees. Since then, there have been 71 cheetah births at the Park, a true success rate for a species that was almost impossible to breed in captivity before the 1960s. CRES behavior specialists, working with the physiology and endocrinology divisions, have found that cheetah pairings must be carefully arranged because females have silent estrus, and males rely on scent marking to identify females receptive to breeding.

The behaviorist appointed as the J. Dallas Clark Postdoctoral Fellow will take part in projects that are relevant to the Society's mission and compatible with the collection. Over a two- to three-year period, this behaviorist will choose an aspect of animal behavior that affects captive reproduction, such as nutrition, mating, group social interactions, or rearing of infants. He or she will assist the species at the Zoo or Park that need help, according to Dr. Lindburg.

Continued on page 2



CRES is operated by the Zoological Society of San Diego.

James and Jewell Bonner
Sharing an enthusiasm for wildlife. See page 4.

Be My Valentine!
It's easy and fun to adopt an animal. See page 5.

Treating MCF Disease
Research continues on high-risk diseases. See page 3.

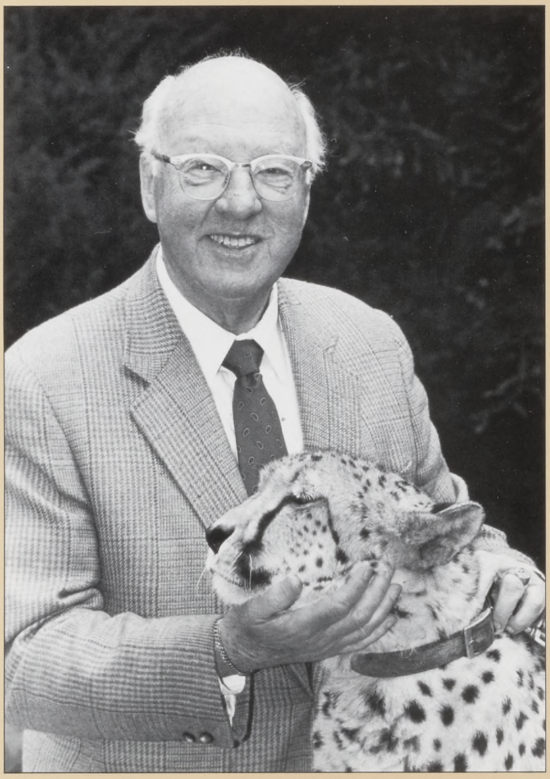
CRES Endowment

Continued from page 1

There is a wide range of active behavior projects to choose from, which numbered 14 last year and include: reproductive behavior and parental care in California condors; the relationship between reproductive success and management styles in captive cheetahs; infrasonic communication in elephants; nocturnal activities and social spacing in lion-tailed macaques; the effects of pregnancy on the social relationships of gorillas, and the effects of the Gorilla Tropics sound system on its inhabitants.

This postdoctoral fellowship is a welcome addition for a division that studies reproduction and enrichment for animals at both the Zoo and Park. The behavior division staff includes four behaviorists, three keeper/technicians, several university work-study students, and dozens of dedicated volunteers who assist the staff with behavioral observations and animal enrichment programs. The J. Dallas Clark endowment will strengthen a division that now provides expertise to several AZA Species Survival Plans (SSP), Taxon Advisory Groups, and IUCN Captive Breeding Specialist Groups, all important extensions of studies done by CRES for the Zoological Society of San Diego.

J. DALLAS CLARK: "Mr. San Diego" and the Zoo



The Zoological Society of San Diego has come to expect generosity and community service from the Clark family, which settled in San Diego in 1887. Dallas Clark's mother, Mrs. Lena Clark, began a family tradition in 1959 when she sponsored the construction of the Clark Theater in the Children's Zoo. The tradition continued when Dallas and his brother, Henry, funded the complete renovation of Clark Theater in 1981; and in 1979, Mary Clark and her brother, Howell Hollis, commissioned the bronze statue of Boy and Gull *at the Children's Zoo entrance.*

Active in many San Diego civic organizations that range from the arts to animals, children, and cancer research, the Clarks became interested in the Zoological Society when Dallas was invited to join the Zoo's buildings and grounds committee in 1958. He was appointed a member of the Society's board of trustees in 1969, and in succeeding years he saw the planning and creation of the San Diego Wild Animal Park. Dallas served as Society board president from 1977 through 1980.

Based on Society needs, the Clarks have sponsored several projects and exhibits at the Zoo and Park. Always a strong Zoo supporter, Dallas Clark has shown his lifelong affection for animals through his major fund-raising for the Society. He has long been an advocate for the preservation of endangered species, as this latest generous gift of the J. Dallas Clark Postdoctoral Fellowship in Behavior for CRES demonstrates. When he was named "Mr. San Diego" in 1993 in recognition of his many civic achievements—in industrial real estate, banking, and economic development—the award also encompassed his significant contributions to the Zoological Society over 35 years.

Infectious Diseases

The infectious diseases division is continuing its research on malignant catarrhal fever (MCF), which is a herpesvirus-caused disease found in deer, antelope, goats, and cattle, including domestic varieties. Principal investigator Dr. Werner Heuschele and his staff—Dr. Roya Lahijani, postdoctoral fellow, Robert Klieforth, laboratory supervisor, and Stacy Sutton, graduate student—have worked for the last two years on improved methods of testing these animals. They are looking for infected animals that have remained healthy—called carriers—which may spread the virus to other individuals in breeding groups of endangered species at the Zoo or the Wild Animal Park.

The primary method now being developed for testing these animals is based on a relatively new technique called the polymerase chain reaction, usually referred to as PCR. In its most basic form, PCR is used to confirm the presence of specific DNA sequences, such as those found in the MCF virus, by making millions of copies of the sequence in a controlled reaction using a clinical specimen such as blood or tissue biopsy. The amplified sequence is then easily detected using one or more additional procedures.

The modified PCR procedure has been used to survey 32 ruminant species, using blood samples obtained by the Society's veterinary staff. Among 86 individual animals tested, PCR results were positive for more than twice as many animals as those detected by the older screening method, which relies on the detection of serum antibodies to a particular variety of MCF virus. There are also suggestions that PCR may be capable of detecting the presence of related virus types which were previously unsuspected. Although much work remains to be done in order to assess the risk posed by the presence of the MCF virus and what may be its close relatives, this technique has a high potential value in the management of endangered species.

Here's a Wish List for Infectious Diseases!

- Benchtop Plexiglas hood for preparation of PCR specimens and reactions, $1,155
- Corning pH meter, $1,392
- Hoefer Scientific motorized rocker platform for molecular biology procedures, $715
- Macintosh CD-ROM drive for accessing DNA-sequence databases, $589
- Magnetic stir plate with infrared heat source, $908
- Mini-electrophoresis and trans-blotting apparatus for protein analysis, $935
- Refrigerated water bath, $1,661
- Semidry blot transfer system for DNA analysis, $685
- White-light (fluorescent) transilluminator, $198

This research was supported in part by The Bay Foundation, Inc., the Institute of Museum Services (a federal agency providing conservation project support to the nation's museums), and the estate of Mr. and Mrs. J.S. Traub.

Cytogenetics

Cytogenetics researchers at CRES have been doing workups on condor blood samples that arrived from the field. From 1981 through 1993, sex determination on the California condor—for a total of 84 birds—has always been carried out in our cytogenetics division by Arlene Kumamoto and, more recently, by Marlys Houck. Chromosomal sexing requires that two cubic milliliters of fresh blood be obtained from each chick to be sexed—and, the samples must be processed immediately. No more than six samples can be processed at one time. Because of these stringent requirements, alternative methods that involve molecular genetics techniques for sexing were explored in mid-1993 by Leona Chemnick. Scientists at Texas Tech University had found that a short, repetitive DNA sequence could be used as a sex-determining probe on DNA fingerprint blots for several species of birds, including the condor. The advantages of this method were that only a small drop of blood was required, samples could be frozen until ready for analysis, and a large number of birds could be surveyed at one time. The technique has been shown to work successfully, generating both a very large and very small DNA band that is seen only in the females. Further work to reduce the time and number of steps needed is underway and should be in place for the sexing of the 1994 chicks.

Sharing an Enthusiasm for Wildlife: The Bonner Summer College Student Fellowship Endowment Fund

Jewell and James Bonner are important ambassadors for the Zoological Society of San Diego: they never lose an opportunity to interest friends in the Society. Jewell is a football fan and followed former San Diego Chargers' place-kicker Rolf Benirschke's successful Kicks for Critters campaign for CRES. As President's Associates for 11 years, they have been involved with Rendezvous In The Zoo (RITZ)—the annual Society fund-raising party—since its second year, in 1985. Jim's long career with IBM and the Bonners' enthusiasm for RITZ also prompted them to donate a computer system to that fund-raiser. Their most recent gift is the establishment of the Jewell H. and James T. Bonner Summer College Student Fellowship Endowment Fund at CRES.

The Bonners' major interest in the Society currently centers on CRES because they believe in what CRES is trying to accomplish, with all the benefits to the animal collection. Having a primary interest in education—including scholarships—they feel that the Zoo affords a great learning ground for students to acquire hands-on experience. In 1992, Auburn University veterinary student Manetta Cornett worked with the behavior division on the role of the sense of smell in cheetah social interactions and reproduction, only one of many projects conducted by CRES summer interns.

> ***. . . the Zoo affords a great learning ground for students to acquire hands-on experience.***

CRES makes these summer fellowships available to interested and qualified university students each year. Because of the multidisciplinary nature of CRES, it is able to provide unique educational opportunities in the fields of behavior, virology, microbiology, immunology, reproductive physiology, comparative physiology, genetics, pathology, and endocrinology. The fellowships are designed for students interested in pursuing scientific careers related to exotic species research that involve work in the laboratory.

Interested students submit an application, transcript of grades, and two letters of reference. Every attempt is made to accommodate school scheduling. Students will usually begin their fellowship in the last week of June and complete their work during the first week of September.

Jewell and James Bonner are urging you to join in supporting this project, pointing to a long list of CRES projects that have benefitted from the studies conducted by summer interns. The summer intern you support could observe feeding behavior in cheetahs or how human routines impact the behavior of captive animals. Food presentation for primates might be studied or their nocturnal activities and social interactions. There are even studies that evaluate visitors' responses to exhibits and animals' responses to visitors, all in the interests of enriching the experience of the animal residents. By sponsoring a summer intern, you can join the Bonners and be a part of the CRES efforts and breakthroughs to improve the health and well-being of vanishing wildlife. For more information, please call Amy Parrott at the San Diego Zoo at (619) 685-3213.

CRES Grants

CRES is pleased to honor recent contributors to endangered species conservation:

*An **anonymous donor** provided funds to assist CRES endocrinologist Nancy Czekala-Gruber's work in giant panda conservation in China. On a recent trip to breeding centers in Beijing and Wolong, Ms. Czekala-Gruber trained Chinese scientists in monitoring the pandas' hormone levels in order to determine estrus cycles.*

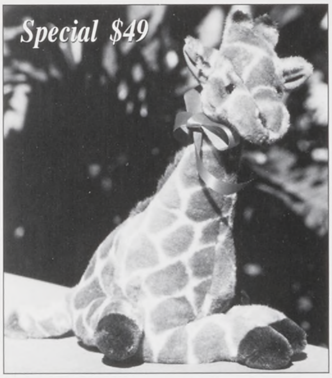
*In a related grant, **Norcross Wildlife Foundation** donated funds toward the purchase of a microtiter, vital equipment that will be used in CRES endocrinology studies to enhance breeding success of giant pandas.*

*A grant from **Chase Manhattan Corporation** will provide the CRES genetics division with needed equipment for the Frozen Zoo. The stainless steel carriers will provide room for additional cell and tissue samples, enabling CRES researchers to expand their efforts in understanding and preserving the Earth's wildlife.*

***Jeanette Henderson** has generously provided funding for a thermal cycler, which will serve both the genetics and virology divisions. To help with CRES reproductive physiology studies, Founder's Circle members **Bob and Lois Hinckle** have provided funds for a photomicroscope and low-light video camera. Their generous gift will be matched by the **General Electric Foundation.** The **Jewell H. and James T. Bonner** Summer College Student Fellowship Endowment Fund has been established through a $50,000 gift from the Bonners. Additional contributions to this fund, which provides student internships for CRES, are being accepted.*

Adopt a Giraffe!

If roses leave you cold and Candy isn't your style... Forget the tame gifts and Give that special someone a Gift they'll be wild about.



This Valentine's Day, give a gift that really stands out in the crowd. In celebration of the Society's newest giraffe, Walker, it's easy and fun to adopt! Your gift will include:

- **A cute and cuddly, plush giraffe toy (13" tall)**
- **An attractive adoption certificate**
- **A special card to announce your gift adoption**

And . . . the knowledge that your contribution will help the researchers at CRES continue their efforts to learn more about endangered animals and their habitats.

Walker was born on August 24, 1993, and currently resides with the main herd of Masai giraffes on the Zoo's Horn and Hoof Mesa. When he was born, he already weighed 154 pounds and was 6 feet 3 inches tall. A giraffe is full grown after 4 or 5 years and can reach a height of 19 feet. Their height and good eyesight allow them to spot their predators at great distances. Giraffes spend most of their day eating. Their tongues can measure 18 inches long and enable them to pull leaves from tall branches. They can lie down but usually sleep standing up.

NOTE: Naturally, your adopted animal will remain at the Zoo or the Wild Animal Park in the care of our professional staff. Please be aware that the lives of animals for adoption are subject to unavoidable changes. For that reason, adoptions are offered by species only, not by individual animal. Special price good until February 7, 1994.

ANIMAL ADOPTION APPLICATION

☐ **YES**, I want to adopt a Giraffe as a gift for:

Name(s) ______________________

Address ______________________

City ____________ State ______ Zip ____________

Please sign the special card announcing my gift adoption as follows:

Your Name(s) ______________________

Address ______________________

City ____________ State ______ Zip ____________

Phone (Day) ____________ (Evening) ____________

☐ Also, please enter my own adoption for a Giraffe at the special rate of $49 for one year.

Please make checks payable to the Zoological Society of San Diego and mail to:

The Zoological Society of San Diego
Adopt-An-Animal Program
P.O. Box 271
San Diego, CA 92112

Or, to charge your adoption by telephone, call (619) 557-3974 between 8:30 A.M. and 4 P.M., Monday through Friday. Orders must reach the San Diego Zoo by February 7 to ensure delivery by Valentine's Day.

☐ Please check here if you'd like more information about our Adopt-An-Animal Program.

AVD4

Cascade Toy: Giving Back to Nature

There's always an occasion when a toy is the perfect gift—whimsical, romantic, or comical. Cascade Toy has launched a new line of stuffed animals and hand puppets that will benefit CRES. Animals such as lemurs, orangutans, meerkats, wolves, African elephants, and black rhinoceroses will be included in the collection, each with a hang-tag that offers educational information about that particular species.

A commitment to wildlife conservation by Cascade Toy is expressed by the president of the company, David Perry: "We have linked our marketing efforts nationally with an organization that is really doing something significant to help endangered species throughout the world. Our new expanded relationship with the San Diego Zoo is exciting, and we feel that being involved with CRES is the least we can do to contribute back to nature. In addition, all of our products are based upon real animals—you might say that much of our design work has already been done for us!"

Cascade Toy stuffed animals and hand puppets are available in the gift shops at both the Zoo and the Wild Animal Park.

You Can Enhance Their Future and Yours...

You can make a significant contribution to CRES and personally help preserve and protect our wildlife heritage by using tax-advantaged estate and financial planning techniques that can actually improve and protect your own finances. There are life income plans that can provide you a lifetime stream of income, federal and state income tax deductions, avoidance of capital gains taxes on appreciated property and securities, and avoidance or reduction of state taxes. With utmost simplicity, the Society's Life Income Fund can provide those benefits with a current (variable) yield of 6.72 percent.

Real estate, securities, life insurance policies, and I.R.A. accounts can make wonderful planned-giving vehicles that bestow many lasting and valuable benefits on you. Most such arrangements will also qualify you for prestigious Circle status in the Zoological Society with lifetime membership, special guest privileges, public recognition of your philanthropy at the Zoo and the Wild Animal Park, and many other perquisites accorded major donors. To learn more about these opportunities, you may obtain a free copy of the Society's "You Can Be a Major Donor" brochure by telephoning Patrick O'Reiley at (619) 685-3215.

CRES REPORT
CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

EDITOR:
Mary Sekulovich

EDITORIAL ASSISTANT:
Betsy Sanders

SPECIAL THANKS TO CRES REPORT CONTRIBUTORS:
Leona Chemnick
Judy Kinsell
Robert Klieforth
Joanne Leidenberger
Amy Parrott

GRAPHIC DESIGN:
Warner Design Associates, Inc.

PHOTOGRAPHS/ ILLUSTRATIONS BY:
Ron Garrison
Ken Kelley

SAN DIEGO ZOO · SAN DIEGO WILD ANIMAL PARK

© Zoological Society of San Diego, 1994.
All rights reserved.

♻ Printed on recycled paper.

Zoological Society of San Diego
Development Department
Post Office Box 551
San Diego, California 92112

CRES REPORT
CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

Non-profit Organization
U.S. Postage
PAID
San Diego, California
Permit Number 410